Indian Journal of Science and Technology 2016 vol.9 N18

New approaches in the interpretation of magnetic survey data during prospecting and exploration of hydrocarbon deposits

Nugmanov I., Nasyrtdinov B., Fattakhov A., Dautov A.
Kazan Federal University, 420008, Kremlevskaya 18, Kazan, Russia

Abstract

The presence of hydrocarbons in the basement and sedimentary cover triggers the epigenetic processes that make the formation of iron minerals possible. At that, there is a fairly clear zoning: The center of flow migration is presented by paramagnetic minerals, the borders are presented by ferromagnetic minerals. This fact makes it possible to use magnetic survey during the prediction and the search for oil and gas deposits. The main problem is the interpretation method of the data obtained through the data magnetic survey. The authors of the article suggest the use of multiple approaches to the analysis and interpretation of the obtained data. The first approach is the lineament analysis, the peculiarity of which in this case is the design of maps on the basis of linear objects expressed in a magnetic field. This map will reflect the borders of objects contrasting by magnetic properties, including the deposit borders. The comparison of magnetic field lineaments and the lineaments of relief helps to identify the fault zones in which the migration of hydrocarbons takes place. Another approach in the interpretation of magnetic survey data is the calculation of the magnetic field fractal characteristics. An indication of hydrocarbon migration in this case is the fractal dimension, the high values of which are characterized for the areas where the migration of hydrocarbons took or takes place. The basic wavelets developed on the basis of point source potential derivatives were used for the quantitative analysis of the magnetic field.

http://dx.doi.org/10.17485/ijst/2016/v9i18/93772

Keywords

Fractal analysis, Hydrocarbons, Lineament analysis, Magnetic survey, Wavelet transformation